

# Frequency of Early Complications of Trans-sphenoidal Surgery

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## ABSTRACT

**Objective:** To determine the frequency of early complication of trans-nasal trans-sphenoidal surgery for pituitary adenoma.

**Material and Methods:** This observational study was conducted at the department of Neurosurgery, Post-graduate medical institute, Lady Reading Hospital Peshawar from June 2009 to December 2010. A total of 63 consecutive patients who undergone Trans nasal trans-sphenoidal surgery for pituitary adenoma with age more than fourteen years were included in the study irrespective of their gender. These patients were followed up to 7 post op days for early complications and frequency of these complications was calculated.

**Results:** Out of 63 patients, there were 52.4% males and 47.6% females. Majority (34.9%) of patients were in the age range of 31 – 40 years, followed by 28.6% patients in age group of 21 – 30 years. Among early post-operative complications diabetes Insipidus was noted in 7.9% cases, Postoperative CSF leak was recorded in 4.8% cases and meningitis was observed in 1.6% case.

**Conclusions:** We conclude that most of our patients with pituitary adenoma were males in their 3<sup>rd</sup> or 4<sup>th</sup> decades of life. Diabetes Insipidus was the most common early post-operative complication followed by CSF leak and meningitis.

**Key Words:** Pituitary adenomas; Tran's nasal trans-sphenoidal surgery; postoperative complications; diabetes Insipidus; CSF leak; meningitis.

## INTRODUCTION

Trans-sphenoidal surgery is a standard procedure adopted by neurosurgeons for removing pituitary adenomas<sup>1</sup>. These tumors are slow growing, benign, neoplasms and are more common in middle age men as compared to women.<sup>1-3</sup> These adenomas are associated with significant morbidity because of the mass effect and excessive or deficient hormone secretion<sup>4,5</sup>. The annual incidence of pituitary adenoma is 0.5 – 7.4 per 100,000 people.<sup>4</sup> Trans-sphenoidal approach can also be used for other pathological processes involving sphenoid bone region, Sella and suprasellar spac.<sup>6,7</sup> This procedure dates back some 100 years. It was re-introduced by Hardy in 1960s after introduction of operating microscope.<sup>8</sup>

Despite marked anatomical and technical advancement there are certain complications associated with

this procedure. Although they are minimal but are devastating. These complications are, diabetes Insipidus (7.6 – 19%), anterior pituitary insufficiency (7.2 – 19%), meningitis, cerebrospinal fluid leak (1.5 – 4.2%), hemorrhage into residual tumor bed (0.8 – 2.8%) injury to surrounding structures as optic chiasm injury (0.5 – 2.4%), frontal lobe injury (0.6 – 1.6%), carotid artery injury (0.4 – 1.4%), death (0.2 – 1.2%) and others.<sup>8-12</sup>

These complications can be prevented by safe surgical technique and close postoperative observation and monitoring. Surgical management of pituitary tumors in Pakistan is satisfactory and comparable with the international literature. In contrast with Western series, our patients are more likely to present with a macroadenoma.<sup>1</sup>

Because of limited local studies available on

complications of trans-sphenoidal surgery, present study was designed as to adopt early intervention to improve the outcome in the light of the result of this study.

## MATERIAL AND METHOD

This observational study was conducted at the Department of Neurosurgery, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar from June 2009 to December 2010. We included patients of both genders above fourteen years of age who undergone trans-sphenoidal surgery for pituitary adenoma invading sphenoid sinus and excluded patients with adenomas encasing internal carotid arteries, Active sphenoid sinusitis or sellar / para-sellar lesions other than pituitary adenoma. After getting approval from the hospital ethical committee to conduct the study and taking informed consent, the medical record of patients who underwent trans-sphenoidal surgery was evaluated. The patients were observed for complications up to 7 days after surgery. All information was entered into a proforma especially designed for this purpose. The data was analyzed by statistical program SPSS version 11.

## RESULTS

We had total of 63 patients who undergone trans-sphenoidal surgery for pituitary adenoma, their results are as follows:

### Gender of Patients

Out of 63 patients presented with pituitary adenoma, there were 33 (52.4%) males and 30 (47.6%) female patients with male to female ratio of 1.1: 1.

**Table 1:** Age of Patients (n = 63).

Age	No. of Cases	% age
15 – 20 years	03	4.8%
21 – 30 years	18	28.6%
31 – 40 years	22	34.9%
41 – 50 years	07	11.1%
51 – 60 years	11	17.5%
61 – 70 years	02	3.2%
<b>Total</b>	<b>63</b>	<b>100%</b>

### Age of Patients

The age of patients ranged from 15 to 70 years with the mean age of 38.65 years,  $\pm$  standard deviation was 12.94 years as given in table 1.

### Post-operative Complications

Postoperative complications are given in table 2.

**Table 2:** Postoperative Complications.

Complication	No of Cases	% age
Diabetes Insipidus	05	7.9%
CSF leak	03	4.8%
Meningitis	01	1.6%
Total complications	09	14.3%

## DISCUSSION

Pituitary adenomas account for 15 – 20% of intra-cranial tumors.<sup>13</sup> The mean age of the patients with pituitary adenoma ranges from 40.2 years to 53 years in various studies.<sup>14</sup> We had patients with the age range of 15 – 70 years and mean age of 38.65 years. Most of them were between 3<sup>rd</sup> and 5<sup>th</sup> decades of life. In one study age of the patients was from 23 to 74 years (mean 46.7 years).<sup>15</sup> Mulinda JR<sup>16</sup> documented that pituitary tumor affects individuals of all ages but the incidence increases with age peaking between 3<sup>rd</sup> and 6<sup>th</sup> decades. Our study population was comparatively young; this could be because of low life expectancy in our people.

We had more male patients (52.4%) with pituitary adenomas compared to the females (47.6%) with male to female ratio of 1.1: 1. While in one study the male / female ratio was 1.9:1<sup>14</sup> Two local studies also reported male predominance in their studies.<sup>17,18</sup>

Contrary to the above results some studies have reported that pituitary adenomas are more common in females. A Study of 83 patients with the diagnosis of pituitary tumor, 52 were women and 31 men. Another group of patient who had undergone trans-sphenoidal microsurgery 59.7% were female and 40.3% male.<sup>14</sup> The Most probable reasons for this difference in results is that our females are shy and hesitant to take the medical consultation for their health related problems so lesser number of patient presenting to doctor for treatment. There might be some genetic and hormonal difference responsible for development of tumor more

in males in this part of the country. In contrast, Khan AN et al<sup>19</sup> shows equal distribution of pituitary tumors between men and women.

We observed our patients for postoperative complications like diabetes Insipidus, CSF leakage and meningitis. Diabetes Insipidus is a relatively common complication of trans-sphenoidal surgery. This is most often transient and is due to surgical manipulation of neurohypophysis. In our study 7.9% of the patients had diabetes insipidus after surgery. Out of these one patient had persistent diabetes insipidus. The rate of this complication has been reported in the range of 10 – 60%. Nemergut EC<sup>20</sup> observed 1571 patients who undergone trans-sphenoidal surgery and 31% of them had early postoperative Diabetes insipidus. Of these 6% had persistent diabetes insipidus.

Kristof RA and colleagues<sup>21</sup> observed that 38.5% of their patients had postoperative Diabetes Insipidus and was transient in most cases. Sudhakar N and colleagues<sup>12</sup> saw that postoperative diabetes insipidus was commonest complication that is 23%. This complication is more common in patients with micro adenomas having Cushing's disease, ACTH secreting adenomas and large tumors with hypothalamic extension. The occurrence of this complication also depends on experience and skill of the surgeon<sup>22</sup>. The frequency of diabetes insipidus in our study in contrast to the international research is low; the most probable reason behind it could be that we had not included those cases with extensive parasellar and hypothalamic extension. Secondly neurosurgeons are meticulously cautious so as not to manipulate the pituitary stalk and hypothalamus. Thirdly, due to differences in sample sizes.

We observed cerebrospinal fluid leak as another complication in our study. Three cases suffered this problem which comprised 4.8% of the total patients. This is comparable to other observations which gave the range of 0.5 – 15%.<sup>23</sup> In another study, the incidence of cerebrospinal fluid leak (CSF) was 13%. It was more common in cases with more aggressiveness towards complete tumor removal. This increases biochemical cure rate of functioning pituitary adenoma but on the other hand higher incidence of CSF leak.<sup>24</sup> The risk of this complication increases with extended trans-sphenoidal approach for pituitary adenoma invading the anterior cranial base and clivus.<sup>25</sup>

Meningitis was another complication we came across in our study. One patient (1.6%) had this complication after surgery. Meningitis is more common in patients who have post-operative CSF leak. The total incidence of meningitis after trans-sphenoidal surgery

is 1 – 2%. This complication is because of ascending bacterial infection and can be prevented after closing the CSF leak.<sup>26</sup> These results are comparatively less than as reported in various international studies.

The overall complication rate in our study was 14.6%. In one study the overall complications were 26.8% in patients,<sup>27</sup> which is more than ours. The combined risk factors for these complications are the size of the tumor, hypothalamic extension, and age of the patient and depend on experience and number of cases operated by neurosurgeon.<sup>27</sup> The other reason could be difference in sample size.

## CONCLUSIONS

We conclude that most of our patients with pituitary adenoma were males in their 3<sup>rd</sup> or 4<sup>th</sup> decades of life. Diabetes Insipidus was the most common early post-operative complication followed by CSF leak and meningitis.

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